University of California
Lawrence Livermore National Laboratory

Nonproliferation, Arms Control, and International Security Directorate

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NAI enhances national and global security by stemming and countering the proliferation of weapons of mass destruction

Mission

The Nonproliferation, Arms Control, and International Security (NAI) Directorate provides technology, analysis, and expertise to counter the proliferation of nuclear, biological, and chemical weapons.

The New Threat

The proliferation of nuclear, biological, and chemical weapons (collectively known as weapons of mass destruction, or WMD) is a growing threat to national and global security. Instabilities resulting from the breakup of the Soviet Union have given rise to new threats, particularly as related to surpluses in nuclear materials and nuclear weapon know-how. Regional tensions and conflicts continue to erupt, and various nation-states are attempting (openly or covertly) to acquire weapons of mass destruction. In addition, the World Trade Center and Oklahoma City bombings plus the nerve-gas attacks on the Tokyo subways raise the specter of terrorist use of WMD.

Making the World a Safer Place

We are addressing the problem of WMD proliferation at all stages—prevention, reversal and response—while avoiding surprise at each stage:

• ***Proliferation prevention and arms control.*** This program element focuses on the prevention stage. It integrates our activities, capabilities, and technologies for nuclear materials control. It also combines our treaty verification technology R&D with policy analysis and support for U.S. arms control activities. International cooperative efforts, particularly with Russia and China, are an important aspect of this program.

• ***Proliferation detection and defense systems.*** This program element concentrates on proliferation reversal. Here, our work to develop detection technologies is integrated with critical systems analysis so that advanced technology can be optimized for operational settings. Technologies and analyses to identify, assess, and counter proliferant activities are central to this program.

• ***Counterterrorism and incident response.*** This program element deals with the response phase. Long-standing Livermore capabilities in nuclear emergency response are augmented with similar capabilities for chemical and biological weapon emergencies. The program focuses on the application of technologies and operational capabilities to respond to WMD emergencies or terrorist incidents.

• ***International assessments.*** This program element address the need to avoid surprise regarding foreign WMD activities. Livermore expertise in nuclear weapons science and technology is central to this work. Multifaceted analyses incorporating technical, economic, political, and other drivers are conducted in collaboration with the U.S. intelligence community to evaluate foreign weapons programs.

National Assets

We contribute to national and global security by providing expertise, technology, and support through a number of unique centers and capabilities:

- Forensic Science Center.
- Communicated Threat Assessment Center.
- Conflict Simulation Laboratory.
- Center for Global Security Research.
- DOE's Nuclear Emergency Search Team.

Recent Accomplishments

- Development and testing, in collaboration with Russian scientists, of nuclear-material monitoring equipment as part of U.S.–Russian agreements on the dismantlement and storage of nuclear weapons.
- Collaboration with research and manufacturing facilities in the former Soviet Union to enhance the protection, control, and accountability of nuclear materials stored or processed at those sites.
- Work with the Russian navy and the Murmansk Shipping Company to improve the protection of fuel for their nuclear-powered vessels.
- Coordination of the first-ever nuclear smuggling exercise to assess domestic capabilities in nuclear forensics and help guide U.S. efforts (technology and policy) to counter nuclear smuggling.
- Development and fielding of various sensor systems, including an unattended system called INSENS for the U.S. Immigration and Naturalization Service.
- Development of a versatile and powerful modeling system for analyzing the proliferation activities of foreign countries and evaluating the consequences (e.g., environmental and socio-economic effects) of possible interdiction options.
- Successful demonstration of a mini-flow cytometer and a mini-PCR instrument for field detection and identification of biological agents.
- Provision of technical support (e.g., monitoring methods) and intelligence analyses (e.g., foreign nuclear test programs) to support negotiation of the Comprehensive Test Ban Treaty.

Benefits to the Nation

National security rests on the twin pillars of (1) reducing the threats posed by others—by stemming and countering the proliferation of weapons of mass destruction—and (2) deterring aggression against the U.S.—through diplomacy, treaties, and military strength. Both national security thrusts involve a complex combination of policy and technology. We apply Livermore expertise in nuclear weapons, developed through our past work in nuclear weapons development and nuclear testing and through our continuing stockpile responsibilities, to the challenge of nuclear nonproliferation. Because the threat of proliferation is not restricted to nuclear weapons, we are building on the laboratory's large investment in chemical and biological science to develop the technologies, analysis, and expertise needed to stem the proliferation of chemical and biological weapons. Our Center for Global Security Research provides a bridge between the technology and policy communities, exploring ways in which technology can enhance national and international security.

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